EUGENICS, POPULATION TRENDS AND THE WORLD'S RESOURCES *

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Introduction

IN this paper I propose to cover such a wide field of inter-related facts and effects that you must, please, excuse a certain abruptness in the description of present trends. In a paper read to the Royal Geographical Society† about eighteen months ago I described population trends relative to the world's biological resources. I stressed that the field was dynamic and that the answer, measured in terms of human well-being, depended on the relative rates of the trends involved. In concluding I mentioned that, "eventually active and voluntary adjustment of populations will be as inevitable as it is already desirable." This afternoon I want to present briefly that same dynamic field of numbers relative to resources, and then carry the argument further, into the special realm which is the concern of the eugenist.

Biological Resources

Needs, determined by population, are met over a wide field by biological resources. The supply of these biological resources is dependent upon a whole host of factors, some of them favourable, some of them unfavourable. Some of these factors are constant, some of them dynamic in their incidence ; some are under our control and some are not. Frequently factors on the biological plane are both accelerative in action and accumulative in result. I shall deliberately leave aside the problems set by our economic system, in which individual and national need and purchasing power so often seem almost to be in inverse ratio.

Biological resources derive from the present growth and reproduction of living organisms, both vegetable and animal. It is axiomatic that for all supplies derived from living organisms there is a particular annual cropping rate which will give the maximum harvest on a sustained yield basis. This is the rational rate of cropping, and departure from it in either direction results, over a period of years, in reduced yields. This principle is of primary importance, whether we are considering fishing, grazing, lumbering, or the fertility of the soil itself. Area is the most important single factor in production, and the total area available obviously has an upper limit.

The biological resources with which we are concerned supply the whole of our food (with such minor exceptions as salt and saccharine) and a large part of our industrial raw materials. Usually food and industrial crops are in competition for the same areas of land. This competition will continue to be inevitable. Sometimes the calls of food and industry compete for the same commodity—for example, fats and vegetable oils. There is now a moderately well-agreed level of nutrition which is deemed necessary for the individual. There is no similarly agreed level of supply of rubber, timber, fibres, paper, soap, and so on. Present shortages of food have shocked us all. But the avoidance of actual starvation is very far from being enough. We have begun to realize in recent years just how large is the gap between a diet sufficient to maintain life and one adequate for full health and vigour. Here it is worth noting one respect in which our species seem to differ from most other animals, certainly most mammals and birds. On a badly deficient diet, humans continue to reproduce at a rate which is only slightly reduced. This is a point of leading importance in world affairs.

Inadequacy of Supply is Normal

It is evident that a very large proportion of the 2,000 million people of the world, even

* A paper read before the *Eugenics Society* on November 18th, 1947.

† *Geographical Journal*, **107**, pp. 194-210, 1946.

in " normal " times, exist on an inadequate diet. The present near-famine conditions in large areas of the world are not something novel but simply an intensification of the pre-existing lack of adjustment between supplies and numbers, between availability and need. There has been and is far from true world sufficiency of any biologically produced material, whether for food or industry, if we hold total need as our criterion. The gap between need and supply is immense, though largely unmeasured. Occasional temporary gluts have been spurious, arising from lack of purchasing power and not from real sufficiency.

The problem of inadequacy is of especial significance within the British Commonwealth and Empire, a sample of the whole world which contains abnormally great inter-territorial goodwill. Here, in the Mother Country, some forty-five millions of us import about half our total sustenance. Highly industrialized, we support a relatively high standard of living. The vigorous Dominions overseas, totalling less than twenty-five millions of European origin, have an even higher standard of living but are among the world's greatest food-exporting countries. The new Dominions of India and Pakistan, with their 400 millions, import only a fraction of their food and have an extremely low average standard of living. The Colonies, so diverse in their evolution, character, people and appearance, are scattered along the path which has India and Canada at its two extremes. The United Kingdom imports the largest quantity of food of any country in the world. India and Pakistan, with nearly ten times our population and one-fifth of the world's total, import relatively little to meet their immense and swelling need.

Population the Measure of Need

What we need to know, on the world scale, is whether the land is potentially capable of producing enough to meet present and future needs and, if capable, how soon? The present answer is, " We do not know, but we hope so." The reason lies partly in our inability to view the background to these questions as an integrated and dynamic whole. In presenting the background one needs to integrate, first, changes of real need as measured by changes in human numbers and standards; secondly, a group of factors helpful in increasing supplies, for example the cultivation of new lands, irrigation works, the use of new crop varieties and cultivation practices; and, thirdly, a host of factors tending to diminish supplies, including land degradation and irrational exploitation.

First, what in our days is happening to the total population of our species? This is the central factor which measures our total needs. The answer is well known to members of this *Society*. We live in days of very rapid increase of population.

Population Changes and Decrease of Mortality

Outside specialist societies there is a remarkable lack of appreciation of the great increases which are taking place in the numbers of our own species, and indeed of population affairs in general. The usual assumption is that, because we reproduce so much more slowly than our domestic animals, and the length of each generation is so long, our own numbers cannot increase rapidly. To you the falsity of that assumption needs no stressing. Mankind takes such peculiar care of its relatively few young that actual increases in man's numbers can be rapid. In these islands we have increased our numbers approximately eightfold in the dozen generations since the middle of the seventeenth century. In the four generations of the nineteenth century we quadrupled our population, and this despite heavy emigration.

Carr-Saunders* points out that this modern trend towards much increased numbers must be unprecedented in human history. It follows that we live in a time when total human needs, and total human pressure on the biological resources of the world, are rising at an unprecedented rate. This pressure is made all the greater because, in the last few decades, world opinion has begun to recognize that human needs should be met by adequacy for full individual develop-

* *World Population*, 1936. Clarendon Press.

ment, and not only by sufficiency for survival and reproduction. At the present time it is doubtful whether we are in a position to provide, on a world basis, even enough for the survival of many. It is the relative rates of increase of population and supply which are of leading importance.

The present unprecedented increase in human numbers is, of course, not a process which is going on equally all over the world. In general, the fourfold increase of world population in the last three hundred years has been the result of decreased mortality—a decline in the death-rate and not an increase in reproduction. Because we value the individual human life and are philanthropic in sentiment and in action, we must expect an extension of the process of removing causes of mortality. Therefore we must expect, and budget for, substantial further increases of world population in the coming decades. That is inevitable, unless the former causes of mortality are to be allowed to re-assert themselves or unless we assume, as we have no right to do, that fertility will fall rapidly.

In particular it is the English-speaking peoples, on both sides of the Atlantic and elsewhere, who now have a replacement rate which falls below unity. But these groups with a replacement rate near unity or below are not typical of the world as a whole.* We have no good grounds for expecting that certain other populations of the world, now quickly increasing in numbers, will shortly reach the condition of the English-speaking peoples. Their fall in replacement rate may come, but it is likely to take several decades if not generations. If we are successful in our efforts to promote the well-being of all peoples, we must expect that for a while there will be an increased rapidity of population growth on the world scale.

A single example is enough. I quote from a recent pamphlet by Professor A. V. Hill.† He remarks that, " There are over 400 million in India to-day—more than eight times the population of Great Britain ; and they are increasing now by fifteen per thousand annually, about six millions every year. The mortality is very high ; at every age up to fifty-five it is four to eight times ours. . . . Only half the people born reach the age of 22, with us, two-thirds reach 60. Of Indian girl babies born, only 57 per cent reach child-bearing age, compared with 88 per cent of ours ; and although in India only about half the girls who reach that age survive to the normal end of the child-bearing period, as compared with 89 per cent in England, they nevertheless produce on the average twice as many babies as English women do. As public health measures and nutrition improve, the mortality will diminish and the population will increase still faster. . . . The present rapid increase of population is a sign that conditions have substantially improved in recent years. . . . The first of all India's requirements, if she is to be happy, efficient, and prosperous, is better health, and that implies beyond everything more and better food. But the immediate consequence of better health and better food is a lowering of mortality, which means a further increase of population. . . ." Members of this *Society* know well the arguments, that industrialisation may lower birth-rates, that education leads to contraception, and so on. The time factor is involved. There will be general agreement here with Hill's conclusion with regard to India—a population increase from 400 to over 700 million within a few decades, and a real requirement of food three times what it is now. The increased quantities of food which must be made available are enormous. As a rough measure it may be said that 1 oz. per day extra for everyone in India involves, at present, a total of roughly 4,000,000 tons per year. Over a million tons of extra food is needed each year to feed the present annual increase of between five and six million people.

India is not however an isolated example of present trends. A parallel course will probably be run by China if conditions improve. She holds another fifth of world

* For example, see Dr. C. P. Blacker's " Stages in Population Growth, EUGENICS REVIEW, **39**, 3," October 1947.

† *India : scientific development or disaster?* India-Burma Association, 1944. (The text of an address to the East India Association on July 4th, 1944.)

population, with a mortality rate probably exceeding that of India. Indeed there is doubt whether her population has risen at all in recent decades. The same pressure on the means of subsistence, the same low standard of living, the same high mortality at all ages, is very evident too in such geographically circumscribed areas as Egypt and the West Indies, Ceylon, Java, and so on. The rate of increase of the availability of food seems, at least in some instances, not to have kept pace. Exertions in the fields of agriculture, engineering, and public health continue.

Fortunately, there are in the world a number of great countries which have huge exportable surpluses of food and other biological materials, so that in recent times, despite the real and unreal problems set by transport and finance, major famines have been infrequent.

Migration

Migration is considered by some to offer a solution to many problems. Successful and desirable migration involves two processes, one physical and one largely psychological. The physical aspect is that of transport and organization. If it is hoped that India's problem may be met by draining off the annual population increase in planned migration, that hope is set too high. India's net increase daily totals fifteen thousand. Sufficient shipping could scarcely be provided, quite apart from all other considerations. From the psychological aspect, it is evident that no acceptor country will want to receive immigrants at a rate faster than that at which they can be absorbed culturally and politically.

Future Population and Future Food

We must then, at this stage in our consideration, conclude that if we are successful in our plans for bettering the lot of the individual, and probably even if we are not, the population of the world will increase substantially in the next few decades and probably generations. Equally we must conclude that during this period we must increase the availability of food and other organic materials in much greater proportion. Is this increase in fact possible, are we capable of achieving it, and are our present efforts yielding results at the rate required to meet increasing need? It has already been stated that some factors in the environment are helpful and some the reverse. Here, too, relative rates of action are of great importance. Let us first consider some of those factors or trends which appear to help towards important increases in the production of organic matter for man's use.

Trends and Factors: Increased Areas of Cultivation

There are certain areas of the world where the land is properly cultivable, but in fact is not cultivated, because there are not enough people available on the spot to do the job. The Amazon basin, parts of Burma, New Guinea, and Sumatra are examples. I remind you here of the new East African groundnut scheme. Additional areas may be brought into agricultural production by means of new irrigation systems and by the extension of old ones. The Nile system affords the most widely known example. Already for some months each year no Nile water enters the sea direct. The sea receives only the water pumped from the main drains after passage through the soil of the irrigated lands. India's problem in particular has been stressed, so it should be realized that the irrigated area of the old India, some 70 million acres, is already more than three times the irrigated area of the U.S.A. (the second on the list of countries with irrigation), and more than the combined total of the ten countries with most irrigation after India.* Yet presumably, the greater the dependence on irrigation, the greater the danger in times of periodic or abnormal drought.

Another way in which the crop-bearing lands of the world may be increased is illustrated by the northward push of the wheat-belt in Eurasia and North America during the last fifty years. This has been made possible by the use of faster-growing and earlier-ripening varieties of wheat, and the process of vernalization of the seed grain.

* *The Times*, November 27th, 1945, reporting a Viceregal statement.

Improvements in Technique

There is still much to be done all over the world, in the advancement of agricultural technique and animal husbandry and pest control. Great advances have been made, and can continue to be made, in the actual productive efficiency of the living organisms which are our means of subsistence. But the distribution of these improvements over the world is extremely uneven. There is far to go before we can reap the full benefits, even of the improvements already known to us.

Fisheries

Similarly, there are great strides to be made in the development of fisheries, and considerable efforts are being made to that end, both in the fresh waters and in the sea. Fisheries have the advantage that we can reap where we have not sown, and we can reap in the open, little hampered by the habits and the habitations of men.

Hindering Factors: The Individual Outlook in Hot Lands

Let us now look on the other side of the picture, at those factors and trends which are unhelpful.

Stockdale,* speaking in particular of the West Indies, has pointed out that "Most people in moist, hot tropical climates do not want to work very energetically for long hours: they seem to prefer to be satisfied with a lower standard of living and more leisure and they would, it appears, rather take life easily than add to their material comforts. This is an outlook which no one has a right to condemn, but it carries with it the corollary that the standard of living of most workers in such areas cannot be expected to rise enough to be comparable with western standards." That is a point which is too often overlooked.

Land Degradation

Processes of land degradation are now world-wide in their distribution, but vary greatly in cause and local importance. Local decreasing fertility and crop yields are often early symptoms of that disease which may develop into gross land degradation. Such degradation and erosion is now recognized as being ancient in local but recent in widespread incidence. The immediate agencies of erosion are wind and water, following removal or damage to the pre-existing plant cover. The causes of this damage are usually associated with improper exploitation in grazing, ploughing, firing, felling, or the collection of domestic fuel. This improper or too violent exploitation is itself the result of pressures, financial, biological, or otherwise.

In the United Kingdom our gentle and tolerant climate, together with the peculiar consistency of most of our soils, allows us to behave in a way which elsewhere in the world would rapidly lead to extensive erosion. The steepness of slope which can be safely ploughed is one example. There are now few countries in the world where land degradation, in one form or another, is not of major importance. In aggregate, the result of land degradation is that great areas of the world are producing less organic matter for man's use each year than those areas should properly produce. This process of degradation tends to be both accelerative in action and accumulative in result. The necessary counter-measures are usually obvious. But these take time, often at the cost of still further reduced production, before their cumulative effect can be seen and felt. Frequently, the degradation itself is a result of the rapid growth of the local population, whose pressing needs retard the necessary counter-measures.

Irrational Exploitation

Allied to this problem of land degradation is that of the irrational, over-exploitation of biological stocks. Each one, whether it be whales, wood, wheat, or wool, has a rational cropping rate, determined by the natural rate of growth and increase, and the local environment. Exploitation, at a rate which exceeds the rational, results in reduced yields later: it is stealing from the future. Yet over a wide range of biological production, living stocks, both of plants and animals, are being over-cropped to our own present and

* *Development and Welfare in the West Indies*, Colonial, No. 189, 1945, p. 12, para. 61.

future detriment. This process, too, tends to be accelerative in action and accumulative in effect.

A large proportion of the forest lands of the world are still being over-cut, the yearly fell exceeding the annual increment of woody substance. Likewise, it is regrettably true that a large proportion of the most important fisheries in the world, particularly the trawl fisheries of north-west Europe, are being over-fished. Similarly, many areas of the world are at present being over-grazed.

Tradition

Conservatism and the continued use of obsolete varieties, techniques, or customs also account for a less than rational production from many areas of cultivated land. Unnecessarily low yields are also frequently to be attributed to unsatisfactory systems of land tenure. Excessive fragmentation, sharing, frequent redistribution of village lands, strip cultivation up and down the slope, and other anachronisms are common examples. All of them are a particular hindrance to the planting of trees and any form of conservation cultivation.

Integration of the Trends

These then are the circumstances. Particular areas of the world, and the world as a whole, have populations which are rapidly increasing, a process which is likely to go on for several generations. The people have to be supplied with organic materials which can only be obtained by the cropping of living plants and animals. The amount properly needed by each individual is much more than, on the average, has ever been available so far: the deficiency is measured in misery. There are certain processes at work which are favourable to increased availability for the individual, and there are other processes and circumstances which are unfavourable. Many believe that service to others is a constant duty, and that therefore we should press forward in our efforts to provide health and adequacy for every individual. The question is whether adequacy is possible now and in the future, and whether we are acting with vigour enough to attain it.

The rapid development of biological production involves two chief processes: one the knowledge of what should be done, the other the doing of it. At present, in most areas, knowledge is far ahead of practice. Practice, consequently production, is very largely dependent on the actions of a great diversity of individuals all over the world who have in common one particular attribute—conservatism. Education and largely dependent on the actions of a great diversity of individuals all over the world who have in common one particular attribute: conservatism. Education and demonstration are the standard and the desirable methods of overcoming conservatism and so leading on to improved techniques and larger production. Fortunately, education and its results are accelerative and accumulative. But it may well be, when quantitative assessment of the factors has been carried out, that instances will occur in which the results of education are demonstrably insufficient. If this is so, it may, however regrettably, be necessary for a time to resort to coercion. An unpleasant doctrine, indeed; yet what is the alternative? The quantitative data, relating to numbers, needs, and the environmental factors involved in production, must be obtained and action taken in accordance with the results.

There must then, in this matter of population trends relative to the world shortage of biological resources, be appreciation that the background is dynamic, that the relative rates of the factors is of immense importance, and that eventually active and, let us hope, voluntary, adjustment of populations will be as inevitable as it is already desirable.

Conclusions Rightly Drawn by Malthus

That, I suggest, is a fair picture of the present interaction of population trends and the world's biological resources. We cannot escape the conclusion which a great man reached long ago. Dr. Malthus was indeed essentially right. The truth of his principles for over a century has been blurred and neglected. We need not to-day discuss the reasons for that neglect. Certain aspects have been revealingly set out recently by

Flugel in his small but very helpful book, *Population, Psychology and Peace*,* in a chapter headed "Why Malthus is so hard to swallow." There is no gainsaying the fact, whatever the theoretical possibilities, that there are alive in the world to-day more people than there is food enough to supply them adequately. Even supposing the rate of improvement of productive efficiency was accelerated to run parallel with population increase (and suitable administrative and other arrangements were made) still there must be a limit to the total of people who can be adequately nourished on the surface of a globe of fixed size. C. B. Fawcett, in a recent paper,† has concluded, "It is clear from the estimates here given that the world as a whole is capable of supporting a population much more numerous than that which it carries to-day. The immediate problems of over-population are limited to some few areas; and the present-day 'pressure of population' is not against the limited resources of the earth but against the various barriers, natural and artificial, which hinder access to those resources. Yet the fact that the size and natural resources of the earth are fixed and limited ensures that its human population cannot increase indefinitely. With our present powers of production the world may be able to support three times its present population in reasonable comfort. But if the present rates of increase are maintained that number will be reached in less than a century from now." In fact of course, even our present population of two thousand millions is not supported in reasonable comfort.

Limitation of Population

There can indeed be very little doubt that, despite all our efforts, during the coming century world population will continue chiefly to be limited, as it has been in general in the past, by factors which are painful to the individual and distasteful to educated sentiment. The Punjab and Egypt are woeful recent reminders. Floods, fires and earthquakes will take their usual toll, but the main limitation on world numbers will be from famine, disease and strife which are directly or indirectly density-dependent in their incidence. All populations of animals are in fact believed necessarily to be limited by such factors.* The use of contraception itself is probably dependent upon density, though often indirectly through economic influences. When eventually man limits populations deliberately in the common interest, that limitation, too, will in fact be directly dependent upon density. Surely such controlled limitation must be more acceptable to the sentiment of a thinking world than the present uncontrolled and painful factors of limitation.

The Possible Effect of Population Density on the Individual

I should like to digress here for a few moments on the subject of the reactions of dense populations limited by the usual distasteful factors. Take, for example, the extremely dense and poverty-stricken populations of the poorer parts of Cairo or Calcutta —populations living in squalor, with a dietary far below what is nutritionally desirable, and scourged by disease—populations of great density in which the environment presses very severely on the individual. I suggest that in such populations there is observable something similar to what is well known in populations of lemmings, locusts and certain other species when the density has risen above a particular threshold level. The lemming, normally a timid, nocturnal animal, becomes aggressive, excitable and active in the daytime and moves in swarms when density becomes high and food supplies scarce. The locust under similar conditions passes from the solitary to the gregarious or migratory phase, anatomical changes taking place in addition to changes in individual psychology or reactions. In densely populated cities of men, burdened by excessive environmental pressure, do we not observe similar and comparable changes, an increase of individual excitability com-

* C. A. Watts, 1947: The Thinker's Library, No. 117.
† *The Advancement of Science*, **4**, No. 14, June 1947.

* For example see summary provided by A. C. Crombie, "Interspecific Competition," *J. of Anim. Ecol.*, **16**, No. 1, May 1947, p. 44-73.

monly leading, under the influence of quite minor stimuli, to banding together, mass violence, mob hysteria, or call it what you will? A rumour, a broken shop window, a child run over by a car, may stimulate a sudden riot bearing no relation in its violence to the trifling stimulus.

Thinking along these lines is important. Certainly such ideas, I believe, throw a useful light upon what has been happening in India, and what to expect there and elsewhere.

Conscious Limitation of Populations to Optimal Sizes

I return from the digression to our main theme. Limitation of populations by conscious control must come. Let us hope, let us strive to arrange, that in the long run the individuals which make up populations will be sufficiently tolerant and educated to use their personal free wills in the common service, both in limitation via contraception, and in reproduction.

When limitation of numbers in the common interest approaches, a whole host of new problems will arise. Now is not too early to begin facing them. Many have already realized that for any particular standard of nutrition and material well-being, which may be chosen as desirable, there must be an optimal population. The optimum may be assessed on a world or on a regional basis, and it will vary in time with changes in environmental factors, technical skills, mutual trusts, and so on. But the existence of an optimal population is a reality, and departure from it will inevitably be accompanied by some degree of misery, or reduced well being. So far, however, those who appreciate the reality of an optimum in populations have, in general, thought of the optimum only in terms of food or economic advantage. But in fact there must be an optimal population corresponding to whatever feature may be chosen as especially desirable. Thus we are forced to seek to decide our ultimate goal and purpose as men on earth. Do we seek a world in which the main criterion is that each individual shall have the best possible diet, or the most luxurious surroundings, or the best physical development, or the greatest spiritual well-being, or what is it? We are forced to consider these possibilities. Most, I think, of whatever persuasion, will approve a goal defined as a state of affairs in which every individual shall have the opportunity to develop to the full all the talents with which he is endowed, physical, mental and spiritual, in the service of his fellows. We must then appreciate that if this is the goal it will be necessary to limit populations in accordance with it. The optimum in fact will probably be very different from an optimum determined on a basis only of food or economic advantage. For example, it may well be that individual mental and spiritual development will always demand opportunity of solitude in surroundings unchanged by man. That might require considerable areas of land not being given over to production or cultivation.

The Eugenic Content of Limited Populations

So far in speaking of populations there has been the tacit assumption that each individual is the equivalent of every other. That, of course, is very far from being so. On whatever basis optimal populations are sought by deliberate limitation of numbers, it will be of paramount importance to arrange that those populations shall be composed of suitable individuals. In fact, to approach the ultimate goal, there must not only be optimal populations but those populations must have optimal contents in terms of heritable individual qualities.

Conclusion

I have tried to focus to-day's discussion on the major physical and biological factors whose influence seems to be inescapable. Political, emotional and other factors I have excluded. The difficulties before us are clearly immense. The first requisite of all is that there should be wide appreciation of our present state and future course, then the reasons, both physical and philosophical. Once there is appreciation we may begin to move, but the obstacles can scarcely be over-estimated. But, on the other hand, lack of wide appreciation now is no reason for

present inactivity. Anything which can be done at this stage by the few to improve the average quality, the gene content, of the individuals making up populations in the near future, will have an accelerative influence in the pace of future advance. That, I suggest, is the background against which our present eugenic effort must be viewed.

The whole problem is one of urgency and importance. It exists because we strive to control mortality and yet possess a sense of values.

Discussion

Dr. S. Vere Pearson: My arguments are going to revolve around two texts, viz.:

1. For every mouth born into the world there is a pair of hands.
2. Nature ordains that, since knowledge and skill advance, man is able to live comfortably on smaller areas.

Therefore it is possible for a full personal development and the enjoyment of a higher standard of living to be attained without "active regulation of population sizes" if these two statements are accepted and sensible action be founded upon them. For I believe procedures under man's control could increase food production and distribution to an enormous extent if only we should awake to the possibilities, and overcome the obstacles which thwart us from using our opportunities.

This is a big subject impossible to cover in the course of a discussion. I shall therefore confine my attention to two points, (*a*) The population and resources of India, and (*b*) A brief reference to the present-day obstacles to improved food supplies for the masses.

As far as we can tell the vast majority of the people of India have always been poverty stricken. But the evidence seems to prove that, up to about thirty or forty years ago (and I shall not attempt to travel beyond that date), British rule there improved matters materially by comparison with previous ages. How was this accomplished? It was largely by means of the enlightened and beneficent method of taxation introduced at the beginning of our régime.

In discussing population trends now, as happened round about 125 years ago, I am always sickened when the name of Malthus is mentioned because almost invariably a harping back occurs to his theories on the Principles of Population, theories now largely exploded, and no reference is made to his chief contribution to the betterment of society. He and his friend Ricardo did more than anyone else to influence rule in India. This benefited its inhabitants and enhanced the renown of the British. It should never be forgotten that for twenty-nine years he was Professor of Political Economy at Haileybury College, where all those going to India, under the East India Company, were trained; and in particular that he elucidated the law of rent and enabled those responsible to prescribe a great improvement of the land system in India; and that increase of food production and of population resulted. Previously the laws and practices of the rulers of India had taken for revenue a share of the gross produce of the land, thereby penalizing all improvements by the tenant and actually preventing a good deal of industry. But through Malthus's and Ricardo's teachings a crop share tenure was based on the net produce, consequently waste land was redeemed, and poor cultivation was replaced by a vast growth of food production. Not only so, but the servants of the Indian Civil Service through the wise start given by Lord Clive during the two years of his rule in India, "the most glorious years in his life" (J. R. Green), were not allowed the least personal interest in land (which was declared to be the property of the State and the source of its revenue) or in any other business in India.

In Bombay Presidency (excluding Sind) there were, according to the first reliable survey of 1850-1, only 12½ million acres cultivated (and about 1827 far less) whereas seventy-five years later nearly three times this amount was under cultivation; and during this period a great increase of the population occurred.

Unfortunately for the people of India, cultivators have slipped back into the pre-

British condition of economic bondage, not to the State, but to the landlord, who was squeezed in between the State and the worker; and not only the cultivator of the soil but also the workers who live in the cities. In ancient days urban land hardly existed. At the outset of British rule, largely through mishaps, large areas of town and village sites remained outside the beneficent action of the just system of raising revenue, and the unfortunate mistake of the "Permanent Settlement" was made covering the very large area called Bengal (a larger one than the present), more than half of which area was at that time waste or unused. Consequently, whereas about the time of the Settlement (introduced in 1793) the rights of the Zemindar was only one year's revenue, twenty years later when this settlement that was to be permanent was still in its infancy land sold at about twenty-eight years' purchase. And since those days the mistake has become more disastrous still owing to an increase of urbanization and the exemption in urban areas of "unimproved" site values for assessment for revenue.

The chief obstacle to the masses obtaining better food supplies in these days when the people of many parts of the world easily produce surpluses and when transport facilities are so well developed is their poverty; and that is not unconnected with the mishaps and mistakes governments have made and continue to make, in particular those connected with taxation. I have just given some obvious hints in my references to systems of levying revenue in India and cannot elaborate them now. Beyond these hints, however, let me say: Are there not too many interferences by the governments of the world, not only upon the freedom of exchange—I am a life-long and unrepentant Free Trader—but also upon the freedom of production through the restrictions and regulations that are imposed upon individual enterprise and through the heavy burdens of taxation? These restrictions and burdens seem to me to bring also, amongst other things, currency troubles and public debts, and conflicts of all sorts which tend to breed war. I am not one of those people who try and imagine that wars have a eugenic effect on population trends.